

REMARKS

Applicants respectfully request that the foregoing amendments be entered at least because the amendments do not raise new issues requiring further search or consideration, and because the amendments place the application in condition for allowance.

Claims 13 and 19 are currently being amended.

This amendment changes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-13, 15, and 17-21 are now pending in this application, of which 1-12 and 20 are withdrawn from consideration.

Allowable subject matter

Applicants appreciate the indication that claim 15 would be allowable if rewritten in independent form. Applicants have not amended claim 15 at this time, however, because applicants believe that claim 13, from which claim 15 depends, is allowable for at least the reasons given below.

Rejections under 35 U.S.C. § 103

Claims 13, 17, 19 and 21 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,060,686 to Jones (hereafter “Jones”) in view of Applicant’s Admitted Prior Art (AAPA). Claim 18 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of U.S. Patent No. 3,632,955 to Cruickshank et al. (hereafter “Cruickshank”). Applicants respectfully traverse these rejections for at least the following reasons.

Claim 13

Independent claim 13 is directed to an underwater laser processing method comprising supplying gas to a certain point from a nozzle. In claim 13 as amended, the nozzle is formed as a disk shape having a flat surface area extending in a circumferential direction thereof for a

complete circumference. Jones fails to disclose a nozzle formed as a disk shape having a flat surface area extending in a circumferential direction thereof for a complete circumference. The nozzle 20 of Jones (see Figure 2) has an end slot 20f to feed a filler material 26a to a nozzle outlet 20c. Thus, the surface of the nozzle 20 facing the workpiece does not have a flat surface area extending in a circumferential direction thereof for a complete circumference, because the Jones nozzle has a radially extending end slot.

Moreover, the structure of the nozzle in claim 13 provides advantages not realized by Jones. When the nozzle is shaped as a disk (having a flat surface area extending in a circumferential direction thereof for a complete circumference), the area of the nozzle facing the workpiece can be increased, and thus the amount of gas trapped between the nozzle and workpiece can be increased. By increasing the amount of gas trapped between the nozzle and workpiece, a shortage of gas available for welding is prevented, and the stability of the welding process is improved. Thus, by forming the nozzle as a disk (having a flat surface area extending in a circumferential direction thereof for a complete circumference), the shortage of gas available for welding can be prevented, and the stability of the welding process can be improved. Jones, failing to disclose the structure of the nozzle as recited, also fails to suggest the advantages attendant thereto.

Cruickshank and AAPA were respectively cited for allegedly teaching separating visible light by a dichroic mirror and inputting the separated visible light into an image sensor, and supplying a welding wire from within a nozzle to a certain point. Neither Cruickshank nor AAPA, however, disclose a nozzle shaped as a disk having a flat surface area extending in a circumferential direction thereof for a complete circumference. Thus, even if Jones, Cruickshank and AAPA were combined, the combination would not meet the limitations of claim 13.

Claim 19

Independent claim 19 recites adjusting a gap between the nozzle and the workpiece using a gap adjuster positioned directly between the optical head and the workpiece. The Office Action appears to equate the carriage 24 of Jones with the sliding member of claim 21 (which is included by the gap adjuster of claim 19). Even if the carriage 24 of Jones could be

considered a sliding member, however, Jones still fails to disclose the invention as recited in claim 19, at least because the carriage 24 of Jones is not positioned directly between the optical head and the workpiece. For at least these reasons, claim 19 (and claim 21 which depends therefrom) is patentable over Jones.

The Office Action states “it is noted that the features upon which applicant relies (i.e., gap adjuster positioned directly between the optical head and the workpiece) are not recited in the rejected claim(s).” (emphasis in original). While applicants do not necessarily agree that applicants relied on the feature of a gap adjuster positioned directly between an optical head and a workpiece to distinguish the references cited in the rejection, applicants have nevertheless now amended claim 19 to expressly recite a gap adjuster positioned directly between the optical head and the workpiece.

As mentioned above with respect to claim 13, Cruickshank and AAPA were respectively cited for allegedly teaching separating visible light by a dichroic mirror and inputting the separated visible light into an image sensor, and supplying a welding wire from within a nozzle to a certain point. Neither Cruickshank nor AAPA, however, disclose adjusting a gap between the nozzle and the workpiece using a gap adjuster positioned directly between the optical head and the workpiece. Thus, even if Jones, Cruickshank and AAPA were combined, the combination would not meet the limitations of claim 19.

Independent claims 13 and 19 are patentable over Jones, AAPA and Cruickshank for at least the reasons given above. The dependent claims under consideration ultimately depend from either claim 13 or claim 19, and are patentable for at least the same reasons, as well as for further patentable features recited therein.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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